INTRODUCTION

The Parker River/Essex Bay Area of Critical Environmental Concern (ACEC) is recognized as a unique complex of ecosystems with environmental, economic, and recreational significance. The area is especially noted for the Plum Island Sound and Essex Bay estuaries, extensive salt marsh, barrier beach and dune ecosystems, shellfish beds, and abundant wildlife. Located on the North Shore of Massachusetts, the ACEC includes 25,500 acres in the towns of Essex, Gloucester, Ipswich, Newbury, and Rowley. Although the ACEC was designated in 1979, this is the first time since the designation that a summary of the natural resources has been compiled focusing specifically on the ACEC.

The resource inventory summarizes existing research and compiles expert field knowledge about natural resources in the Parker River/Essex Bay ACEC. Background information and data is summarized from state agency and conservation group research reports (*see Literature Cited*). Since research efforts generally focus on the two ecosystems of Plum Island Sound and Essex Bay, these regions will be highlighted throughout the inventory. In addition, local scientists and field experts were interviewed in the Fall, 1999 to gain further insight about the status and trends of ACEC resources including: 1) current and future resource trends, 2) gaps in existing research and data, 3) important resource threats or issues, and 4) opportunities for restoration. Their responses are documented in *Field Notes* at the end of the sections on salt marsh, wildlife, finfish, shellfish, and water quality. The interviews, along with information from existing reports, are combined in this report to summarize the condition of ACEC natural resources. Additional background on the area is provided in: 1) Appendix A which is an updated bibliography of ACEC research documents, 2) Appendix B which includes ACEC designation and regulatory fact sheets, and 3) Appendix C which is a contact list for ACEC partners.

Managers, scientists, and local officials who are working to protect ACEC resources can use information compiled in the inventory to: 1) assess local and regional research needs, 2) guide restoration/mitigation efforts, and 3) prioritize future workplans. At the local level, the inventory can be used as background information for writing grants or to update open space and master plans. The inventory is also a tool that can be used by scientists and resource mangers to prioritize and design technical assistance and research programs at local and regional levels.

The salt marsh is a predominant ecological and visual feature in the ACEC. Common marsh animals and plants as well as impacts and monitoring parameters are described in the inventory's **Salt Marsh** section. *Salt Marsh Field Notes* indicate the following topics of concern:

- standardized monitoring protocols,
- tidal restrictions,
- sea level rise,
- recreational boating, and
- increased development along the marsh edge.

Wildlife depends on salt marsh and upland to forage, breed, rest, and migrate to other seasonal habitats. Historical and current records of bird surveys are presented in the **Wildlife** section of the resource inventory. *Wildlife Field Notes* indicate the following topics of concern:

- human impacts on wildlife populations,
- inadequate shore and migratory bird population estimates,
- habitat fragmentation,
- loss of wildlife corridors, and
- recreational boating impacts on wildlife.

ACEC waters provide important spawning, nursery, and feeding areas for many finfish populations. A description of the major finfish species as well as data showing population changes from the 1960s to the 1990s are presented in the **Finfish** section of the inventory. *Finfish Field Notes* indicate the following topics of concern:

- long-term, quantifiable estimates of pelagic fish populations,
- change in large scale, oceanic conditions,
- fish spawning habitat degradation, and
- maintenance and upgrading of fish ladders and dams.

The ACEC continues to be an important shellfishing area on the coast of Massachusetts. The **Shellfish** section of the inventory describes the species being harvested and defines the Division of Marine Fisheries classification of shellfish beds. *Shellfish Field Notes* indicate the following topics of concern:

- qualitative and quantitative data needs,
- over harvesting,
- invasive species,
- aquaculture, and
- water quality and related shellfish management closures.

Physical, chemical, and biological results of water quality sampling as well as potential sources of pollution for Plum Island Sound and Essex Bay are described in the inventory's **Water Quality** section. *Water Quality Field Notes* indicate the following areas of concern:

- development and the associated increase in impervious surface and nutrient loading,
- nutrient sampling in tributaries,
- water quality remediation at identified hot spots,
- septic system failures, and
- agricultural runoff from upper watersheds.

In addition to these sections, the resource inventory describes the regional history, geology and soils, estuaries and tidal flats, land use, open space and recreation, and future ecosystem research in the Parker River/Essex Bay ACEC.